

What is claimed is:

1. A toothbrush comprising a handle, a head mounted to one end of said handle, said head including a cleaning element carrier, said cleaning element carrier being in the form of a peripheral frame having an open central area, a plurality of sets of joints located at spaced intervals of said frame, a plurality of generally thin support members, cleaning elements secured to and extending outwardly from said support members along the length of said support members, each of said support members mounted against and connected to the outer surface of the peripheral wall of said frame at a set of said joints, said peripheral wall extending inwardly below said support members, each of said support members being disposed across and spanning said open area of said frame outwardly of said peripheral wall, and said support members creating an open lattice pattern having through holes over said open area of said frame to facilitate the cleaning of said head.
2. The toothbrush of claim 1 wherein said support members are plates, said joints being slots formed in the outer surface of said frame, and said plates being mounted in said slots.

3. The toothbrush of claim 1 wherein said cleaning elements are bristles made of a thermoplastic material, and said support members being plates made of a thermoplastic material having a melting temperature similar to the melting
5 temperature of said bristle thermoplastic material.

4. The toothbrush of claim 3 wherein said plates and said bristles are made of the same material.

10 5. The toothbrush of claim 3 wherein each of said plates and its bristles form a unit, said unit having a portion which is transparent to laser light wavelength, and a further portion which is laser beam absorbing.

15 6. The toothbrush of claim 5 wherein said laser beam absorbing portion is intermediate the outer surfaces of said plate.

20 7. The toothbrush of claim 6 wherein said laser beam absorbing portion is a weld interface colorant.

8. The toothbrush of claim 1 wherein said support members are plates connected to said joints of said frame by a mounting structure selected from the group consisting of a
25 mechanical fit, an adhesive connection, ultrasonic welding, induction welding, orbital friction welding, and hot wire welding.

9. The toothbrush of claim 8 wherein said mounting structure comprises a mechanical fit connection between said plates and said frame.

5 10. The toothbrush of claim 8 wherein said mounting structure comprises an adhesive connection between said plates and said frame.

10 11. The toothbrush of claim 1 wherein said joints comprise slots in said frame, said support members being plates, said plates being located in said slots, and said plates being welded to said frame.

15 12. The toothbrush of claim 1 wherein said cleaning elements are bristles.

13. The toothbrush of claim 12 wherein said bristles have rounded cleaning ends.

20 14. The toothbrush of claim 12 wherein said bristles form a pattern of differing length.

25 15. The toothbrush of claim 1 wherein each of said support members is a base member having integral strands, and said integral strands being said cleaning elements.

16. The toothbrush of claim 15 wherein each of said base members is laser welded to a plate, and said plate being mounted to said frame at a set of said joints.

5 17. The toothbrush of claim 15 wherein said base member is a nylon base string, and said base member being stretched across said frame and secured to said frame at a set of said joints.

10 18. The toothbrush of claim 15 wherein each of said joints comprises an arcuate seat, said base member conforming in size and shape to said arcuate seat, and said base member being mounted in said arcuate seat.

15 19. A toothbrush comprising a handle, a head mounted to one end of said handle, said head including a cleaning element carrier, at least one cleaning element support plate, a plurality of bristles mounted to and extending outwardly from said plate, said bristles and said plate being made of thermoplastic material having similar melting temperatures, said
20 bristles and said plate forming a unit, a portion of said unit being transparent to laser light wavelength, another portion of said unit being laser beam absorbing, said bristles being secured to said plate by laser welding, and said
25 plate being mounted to said carrier.

20. The toothbrush of claim 19 wherein said carrier is made of a material having a similar melting temperature to said unit, and said unit being laser welded to said carrier.

5 21. The toothbrush of claim 19 wherein said carrier includes a slot, and said unit being mounted in said slot.

22. The toothbrush of claim 21 wherein the cleaning ends of said bristles are rounded.

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23. In a method of making a toothbrush having a handle and a head mounted to one end of said handle, the improvement being in that the head is in the form of a peripheral frame having an open central area, mounting a plurality of cleaning elements to a cleaning element carrier, and mounting a plurality of the cleaning element carriers and their cleaning elements across the frame at spaced intervals to create an open lattice pattern having through holes over the open area of the frame to facilitate the cleaning of the head.

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24. The method of claim 23 wherein the cleaning element carriers are plates mounted in slots in the exposed outer surface of the frame.

25 25. The method of claim 24 wherein the cleaning elements are bristles which are mounted to their plates by laser welding.

26. The method of claim 25 wherein the laser welding is
ND:YAG laser with a continuous wave.

27. The method of claim 26 wherein the plates are laser
5 welded to the frame.

28. The method of claim 23 wherein the cleaning element
carriers are base members having integral strands which form
the cleaning elements, and mounting the base members to the
10 frame.

29. The method of claim 28 wherein the base members are
base strings made of nylon having integral nylon strands ex-
tending outwardly therefrom, and stretching the base strings
15 across the frame.

30. The method of claim 29 including seating the base
strings in arcuate recesses in the frame wherein the re-
cesses are of a size and shape which conforms to the size
20 and shape of the base strings.

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